ARCHITECTURAL EXHIBITION AT THE ROYAL ACADEMY OF ARTS, TRAFALGAR SQUARE, WESTMINSTER.

The seventy-sixth exhibition of the Royal Academy contains in its architectural room only two hundred and eighteen works of art; of these sixty-three are so obviously disconnected from architecture as any subjects of art could be; and if an examination more rigid still were gone into, it could be shewn that the room contains scarcely more than a hundred subjects strictly architectural. With such a diminution in quantity does not follow a like diminution in quality; and though for some years past many of the most eminent architects have almost abstained from exhibiting here, still, upon the present occasion, if there be fewer absolutely good subjects than usual, there are fewer which are common-place or of reprehensible design.

Artists, architects, and the public generally, have for some time past had their eyes gradually opening to the truth that good architecture, and drawing good for a Royal Academy Architectural Exhibition, are very different things; and it is now pretty generally admitted, that the dashing slices of colour, which are just sufficient to outvie a neighbouring picture, and the fitness, and the patient mathematical, botanical, and sculptural perfections, which characterize good architectural design, are very different things.

In the present exhibition are fewer Norman subjects and projects for buildings of an impure or anomalous character; there are fewer that contain those piece-meal blemishes of various kinds, which for some years past have not only pervaded private and ordinary buildings, but daringly have become fashionable even in buildings of a public character. We observe among the designs comparatively few with incongruous one-sided masses, which, because many ancient buildings which have grown up bit-by-bit have been so successfully managed by the artists who had to alter and enlarge them, and have been, as it were, so set about with beauties as though the hand of "wisdom" were laid upon them behind and before, that such anomalies are scarcely noticed, and such buildings appear beautiful, in spite of that which would otherwise have appeared intolerable, there not being a single example of any great building throughout the world, whether Indian, Egyptian, Grecian, Roman, Moresco, or Gothic, which was designed to be irregular; such an idea being against nature, who delights in regularity; animals deformed, being so alone through some accidental circumstances, and the planets returning habitually to the same points in their paths in revolutions of time exactly the same to a moment.

We shall defer till next week going into the separate merits of these architectural drawings.

ELEMENTARY ESSAY ON MORTAR AND CEMENTS.

BY JAMES WILSON, HON. SEC. R.A.A.D.

(*Continued from p.* 255.)

64. Beavan's Mortar, or Building Cement, is composed of marble, flint, chalk, and lime, in equal portions; the first two being pulverized. All except the lime are mixed together and sifted very fine; then the latter, which has been slaked for three months, added, with just water enough to form the mixture into a thin paste. This, when used for stuccoing, is spread as thinly as possible and made smooth over a rough preparatory ground; and it is susceptible of a high polish by means of Venetian talc.

65. Hamelein's Patent Mastic, for coating and ornamenting buildings, is said to consist of Portland stone, pounded and mixed with oil; the latter is used instead of water: it is susceptible of an arris and smoothness equal to marble. A method of using it, extensively practised about town, is first to work the surfaces, projections, mouldings, &c., roughly in Roman cement, and then finish them with the mastic, about ⅛th of an inch thick. Great nicety and experience are necessary to lay it properly and make it attach firmly, but the thinner the coating is the better, and it should never exceed ⅛th of an inch; the more extravagantly thick it is laid on, the more certain it is to fall off. The front of the Union Club-house in Trafalgar Square was stuccoed with it.*

66. Dr. Higgins's Cement consists of 1 lb. pure stone lime, or a very little more chalk lime, 1 lb. bone-ash, 4 lbs. sand ¼th, and 3 lbs. ditto ¼th, of an inch in size: the sand is mixed and spread out flat, about six inches deep, on a hard wooden bench, and wetted with lime-water: the lime is then added in successive portions, mixing and beating them well together; after which the bone-ash, which gives tenacity and prevents cracks in drying, is added in like manner. The inventor says this cement is, when dry, as hard as Portland stone; it dries quickly, and must therefore be used with expedition; it is intended for building, plastering, stuccoing, &c., and is applicable besides for forming artificial stones in moulds, with flints, hard stones, brick, &c. It is unfortunate that the above proportions have been stated by weight, as both lime and sand are variable in that respect, and their relative properties necessarily contingent on the same.

67. The cement for the *Eddystone Lighthouse* was composed of equal measures of slaked Welsh lias lime and pozzolana, both in fine powder; it was beated until it possessed its greatest degree of tenacity and toughness, and was used stiff for the horizontal thorough joints, as well as for the facings of the vertical ones, and in grout for the intenal parts of the latter.

68. The cement used for the piers of the new *London Bridge* was made of one part Welsh lias lime, two parts Neapolitan pozzolana, and two parts Thames sand.

69. The cement in the *London Docks* was for the depth of one and a half or two bricks composed of four parts lias lime, one of pozzolana, one of calcined iron-stone, and six of river sand.

70. In reference to the building of ovens, &c., it has already been stated that Roman cement does not at all endure fire, and hardly even a moderate heat; also that nyster-lime, as well as mortar made with road-drift, are considered suitable for such purposes: but, perhaps, there is nothing better than the Windsor Loam whereof fire-bricks are made, and which is very generally used for building those parts of furnaces and other similar works that are exposed to flame or to intense heat; it is reduced to a proper consistency with water, and laid extending about 2 inches into the joints, the remaining portion of the work being constructed with good ordinary mortar.

71. Parget, or Pargetting, is the name given to a composition for plastering the interior of brick or stone flues; and consists of mortar mixed with horse or cow dung, the latter being preferred and most usually adopted; and is very suitable for that purpose, as it stands the heat well. It is usual to include in building contracts the "coring out" of the flues when the building is completed; which signifies removing the mortar and rubbish, which fall into and adhere in them, out of reach, while the brickwork is being carried up. This was, previous to the passing of the new prohibitory Act, generally done by a climbing-boy. Common mortar, mixed with bullock's hair, and called hair-mortar, is sometimes used for the above purpose, but cannot be so sound or good, as the soundness of the mortar must be impaired by the heat, and it may be considered as chiefly held together by the hair with which it is mixed.

72. Grout, is mortar or cement in a liquid state, frequently used to insure the complete filling up of the internal joints of brick or rubble walls, the outside joints on both faces being in carrying up the work stopped with stiff mortar. It is sometimes considered advisable to grout every course, but in ordinary cases about every fifth course of brickwork is sufficient: its effect is obviously to form the work into a solid mass, by filling up all those interstices which unavoidably occur in constructing the masonry with stiff mortar. It is often merely mortar or cement diluted; but greater economy may be observed without detriment to the work, from five to seven parts of sand being generally considered admissible. When made of mortar, however, it should be made of such as has been kept for a considerable time and well beaten, and then it will set perfectly in a few days; for if composed of mortar that has been newly made, it will take a long time to harden, and perhaps will never thoroughly set. The approved method is to mix the materials dry, dilute and incorporate them well on the spot, and pour the grout immediately into the work. What is termed *hot-lime grout* consists of slaked lime and water only. It need scarcely be remarked that the practice of grouting is beneficial to an important degree; indeed, its omission in any building of consequence would be highly reprehensible, since the walls cannot be perfectly solid without it. Where cement is used instead of mortar, the same material is used in a liquid state as grout.

73. "Concrete" (Fr. Beton) is a kind of artificial rock, composed of large gravel, sand, and lime, a substratum of which is formed preparatory to receiving the footings of buildings, where the ground is of an unsound and treacherous nature: it is a most valuable expedient, and is fast superseding the use of piles and planking, and, indeed, all old methods of obtaining a foundation by factitious means. The concrete about London is usually composed of Thames ballast, limited in coarseness to the bulk of a hen's egg, the larger stones being reduced to that standard; but large flinty gravel, in admixture with clean, sharp sand, frequently occurs in natural strata, in proportions adapted for immediate use. The broken granite which is used for macadamizing roads has also been used with advantage.

74. Its most approved component proportions are, fresh well-burnt lime and sand, in the relative quantities that are allowed in making good mortar, with stone in quantity equal to twice that of the sand; that is to say, one of lime to six of the other materials when chalk-lime is used, and one to nine for stone-lime: the latter ought always to be used in ordinary cases; and blue lias stone-lime, in the proportion of one to six, is the best for works subject to the action of water. It must be observed, however, that with regard to concrete, a remark applies similar to that which was made in article 24, in reference to the composition of mortar, viz, that the more incondensible material abounds in the mass, if *properly cemented together*, the greater stability will be produced, and the less costly will it be.

75. The usual mode of concreting is to grind the lime to powder, without slaking; mix it well with the stones and sand, dry, beside the spot where the concrete is to be formed; add just sufficient water to give to the mixture the semi-fluid consistency of mortar; precipitate it immediately into the trenches from a height of about ten feet; puddle it quickly to a level, and then leave it totally undisturbed until hard, and ready to receive the footings of the superstructure. To disturb it after it had begun to set (which it does speedily), would be to materially impair its solidity; and it should be borne in mind, that when a great depth of it is required, it will be incomparably better if the whole mass can be made at one operation, than if done in successive strata, as the union of these can never be perfect. There is a diminution of bulk, averaging about a tenth, in wetting the materials, and there is an expansion in setting and hardening, perhaps sufficient to restore that loss.

76. The name of Pebble Mortar is sometimes given to a mixture similar to concrete, which is occasionally used for filling-in, at Intervals, the heart of thick stone or brick walls, or large masses of masonry. It may consist of four parts sand, fine and coarse in equal quantities, eight parts small clean pebbles, four parts slaked lime, and one part pozzolana or tarras: it is very excellent for the purpose, and, with proper hydraulic materials, is well adapted for sea breast-works, &c., being done with a casing, after the fashion practised by the Romans: it may be considered analogous to grout, and identical with concrete.

* [We believe this mode of working mastic insures its most rapid falling off, from the dampness of the under-coating disagreeing with the oil of the mastic; and the thirstiness of Parker's cement and lime which we have instantly found destroy the cohesiveness of mastic; in many buildings in and about London the mastic cement in two or three years has fallen into a frightful state of decomposition. At the Pavilion at Brighton, the under part of the mastic was found most destroyed. External bleaching, and the parching away of its oil underneath, in a very short time prove mastic to be of all stuccos the least enduring; for these reasons we have long since ceased from using it, except for repairing internal plastering which is intended to be immediately painted with oil colour.—Ed.]